Space Weather Forecast

Issued on Sunday, 21 January 2024 at 13:29 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Large Earth-directed CME (coronal mass ejection) arrival forecast for 22 January with a likelihood of Moderate Geomagnetic Storm and a chance of Strong Geomagnetic Storms. Risk easing into 23 January. Increased risk of Moderate solar activity.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been Low, with the majority of Common-class flares produced from a large and magnetically complex region in the northeast quadrant. Two regions in the south centre disc have also evolved and continue to be monitored, despite current limited activity. These are three of 10 sunspot regions on the visible disc, with the remaining regions either stable or fading, with negligible activity.

No Earth-directed CMEs have been observed on available imagery in the last 24 hours.

Solar Wind / Geomagnetic Activity: Solar winds were at slightly elevated levels with a declining trend. Total magnetic field strength was weak, with the north-south component also varying weakly. Resultant geomagnetic activity has been Quiet.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary
Solar Activity: There is a likelihood of Moderate activity and a very slight chance of Strong activity during the next four days, mainly from a large and magnetically complex sunspot region in the northeast quadrant.

Solar Wind / Geomagnetic Activity: A fast CME which left the Sun early on 20 January is forecast to arrive at Earth, either later on 22 January or early on 23 January. Otherwise a fast wind may connect with the Earth during 21 January, but with a declining probability through the day. If the feature connects, elevated speeds are possible. Geomagnetic activity may reach Active levels due to any fast wind effects. The CME arrival may increase geomagnetic activity to G1/Minor or G2/Moderate storm levels from late on 22 January, with a slight chance of G3/Strong storm levels. Any activity should then decline slowly in 24 January.

Energetic Particles / Solar Radiation: There is a slight chance of solar radiation storms due either to an increase in activity from AR3559 or from the CME arrival, with the risk increasing slightly through the forecast period.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	80	50	10
Strong	G3	No	1	30	10	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	50	50	50	50
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	15	15	15
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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